

XVI. *A monograph of the genus Ogyris.* By GEORGE T. BETHUNE-BAKER, F.L.S., F.Z.S.

[Read April 5th, 1905.]

PLATE XV.

THIS genus was established and described by Doubleday and Westwood in their Gen. Diurn. Lep. II, p. 472, 1850, where they figured the ♀ of *O. abrota* and used this species in their description of the family. It is a well-marked genus, and as a consequence later authors have had no difficulty in their descriptions of new species, all having been described under the one genus. Hewitson described and figured his several species in his Exotic Butterflies, vol. I, and his Spec. Cat. Lyc. B. M.; whilst in his Ill. Diurn. Lep. Lycænidæ, he again refers to the group and sinks his *orontas* under his *idmo*. The Felders also use the genus in the descriptions of their two species, whilst all later authors have likewise used it.

The genus is confined to the Australian sub-region, all the species but one being found on that continent (Australia): one species has been recorded from Kangaroo Island as well, whilst one is confined to New Guinea. All the species are beautiful in colour, whilst several rival the *Morphos* in the brilliancy of their blues.

I am indebted to Mr. G. A. Waterhouse of Sydney for very many particulars relative to the life histories of the species and also for the loan of a large number of specimens. Mr. F. P. Dodd has also furnished me with many interesting facts about *O. zosine*, Hew., and *hewitsoni*, Waterh., whilst Mr. R. E. Turner and Mr. H. H. Druce and Mr. Tepper have kindly lent me specimens of *O. ænone*, Waterh., *O. barnardi*, Miskin, and *O. halmaturia* Tepper.

The ova are either nearly spherical, or somewhat compressed at each end of the axis, whilst some are strongly reticulated. The larvæ, so far as is yet known, are all

Loranthus feeders, and all feed either at dusk or at night all are attended by ants of various species, some apparently by different species in different neighbourhoods, whilst Mr. Dodd informs me that *O. zosine* (♀ *genoveva*) is attended by two species of *Camponotus* and also by the small black ant. He adds also that both it, *orates*, Hew., and *hewitsoni*, Waterhouse, emit sounds when in the pupa state and when accompanied by ants; if however the ants are taken away the pupæ remain silent—whilst if a pupa be found unattended by ants, it is an almost certain indication that it is dead; the sound is described as a distinct ticking, occasionally accompanied by a soft humming. The pupæ, of which I have several before me, are of the usual *Lycænid* shape, and are found under stones or under loose bark, fastened at the anal extremity and supported by a girdle of silk around the middle, and generally assimilating in colour with their surroundings.

The species of the parasitic genus *Loranthus*, on which the larvæ feed, generally grow high up on the tallest trees, and as a consequence the perfect insect flies high and is a strong flier; this fact possibly accounts for the scarcity of the group in collections generally. The species are probably on the increase, as Mr. Waterhouse informs me that he now breeds *ianthis* in a spot over which during his younger days he collected for years, and of which he knew every inch of the ground, and during this time he never saw a single specimen of this genus; this is however what might be expected, for it appears quite certain that the larvæ and pupæ are protected by the ants, in which case they would be immune from a certain class of enemies, and we might therefore look for the various species to increase in numbers.

The various species form themselves into two obvious sections, the females of which have a pale spot in the primaries, or are without that spot; and in like manner they fall into sub-sections also; the whole being closely verified by the form of the genitalia of the males, descriptions of which I append in the form of a table, though in a few species that have been lent me I am unable to do this.

The tegumen of the whole of the *Lycænidæ* is furnished with a pair of hooks at the lower extremities of the lateral lobes, these I have designated by the term "Falces" (*falx*, a reaping-hook).

KEY.

A. Upper-side generally purple; ♀ with pale spot on the primaries.

a. Sexes nearly the same colour.

a 1. Termen broadly brown, strongly arched *waterhouseri*.

a 2. Termen quite narrow, nearly straight *idmo*.

a 3. Smaller, lighter purple, termen narrowly brown, pattern of secondaries beneath nearly obsolete *otanes*.

a 4. Like 3, but termen broadly brown, broader at apex and tornus *halmaturia*

b. Sexes dissimilar in colour.

b 1. Dull brownish-purple, termen broadly brown at apex tapering to tornus, anal angle of secondaries produced into a short broad tail *genoveva*.

b 2. Brighter purple, termen nearly uniform in width *genoveva-duaringa*.

b 3. Rich purple, larger in size with very large females *genoveva-magna*.

b 4. Very dark velvety-purple (almost brown) with long tail, slightly spatulate, pattern below strongly spotted, no metallic markings in the cell of primaries *meeki*.

b 5. Smaller, very deep velvety-blue, termen black very broad, pale large subovate lemon spot in primaries *abrota*.

b 6. Brilliant metallic-blue with broad black costa and termen; ♀ primaries bright orange, with broad borders *ianthis*.

B. ♀ without a pale spot on the primaries.

- a. ♀ with no red spot beneath in the primaries.
- b. Both sexes dark purple.
- a 1. Purple area very small, nearly the same in both sexes . . . *olane*.
- a 2. Purple area brighter extending up to termen in ♂ . . . *barnardi*.
- c. Both sexes brilliant metallic-blue.
- a 1. Discal band of primaries beneath not fractured . . . *orætes*.
- d. Brilliant metallic-blue; ♀ with red in the primaries beneath.
- a 1. Discal band of primaries beneath fractured . . . *hewitsoni*.
- a 2. Smaller, deeper blue, with pale metallic-blue spots in cell beneath . . . *hewitsoni-meridionalis*.
- a 3. Primaries with very broad black apex and termen, and very dark under-surface . . . *amaryllis*.
- a 4. Brilliant silvery-blue with costa and apex broadly black, beneath very pale grey, with pattern small and isolated . . . *ænone*.

See Tables, pages 290, 291.

OGYRIS, Doubleday, Westwood and Hewitson.

Ogyris, D. W. and H., Gen. Diurn., Lep. II, p. 472 (1850-1852).

Primaries broad, with costa slightly arched; apex subacute, sometimes produced; termen sometimes slightly excavated below the apex, or nearly straight, or slightly convex; inner margin straight. *Neuration*, vein 1 waved, vein 2 arising beyond the middle of the cell, 3 from nearer the lower angle of cell than from 2, 4 from the lower angle, 5 from above the middle of the discocellulars, 6 from the upper angle, 7 absent, 8 from directly behind the upper angle of the cell, 9 from about midway between the end of the cell and the apex of the wing, or from nearer the apex, 10 and 11 with bases

equi-distant from each other and the upper angle of cell, 11 short, 12 short never as long as the cell. Secondaries broad, sometimes with a short broad spatulate tail at the end of vein 2, sometimes with a short tail at end of vein 1 b, or with termen crenulate—♀ sometimes with a short tail at the end of vein 4, with two internal veins—vein 2 rising from just below the middle of the cell, 3 from near the lower angle, 4 from the lower angle, 5 from the middle of the discocellulars, 6 from the upper angle of cell. Palpi curved, with middle segment long, end segment very short and slightly deflexed.

The genus was created for the reception of two species *O. abrota*, D. W. and H., and *O. idmo*, Hew., the diagnosis being evidently made from the former species. It is nearly related both in structure and pattern of wings to the genus *Arhopala*, Feld.; both genera are arboreal, rarely coming down to the ground, and when disturbed from their resting place, they will frequently return to it after the lapse of a little time; this, however, is a habit well known to occur in other genera also.

OGYRIS WATERHOUSERI, spec. nov.

♂. Both wings very dull brownish-purple, almost greasy looking. Primaries with a broad even brown costa and a broad termen likewise of even width. Secondaries with a broad dark brown costa, and a broad brown termen of uniform width. Fringes white broadly intersected with brown at the veins. Under-side. Primaries brown, with three increasing cell spots, the first two divided by an obscure bluish-white line, beyond the third a short broad oblique pale grey stripe, beyond which is the catenulated, very irregular, dark brown stripe, slightly curved extending from the costa to very near the termen at vein 2; the apical area up to this stripe is densely irrorated with whitish-grey fine scales. Secondaries, brown, finely irrorated with brownish-grey, the three basal spots are confluent, in the median row of three spots the two upper ones touch, the second occupying the central part of the cell is large, the third on the inner margin is isolated, the third row is very irregular, first spot on the costa subreniform, the second spot very large, touching the exterior edge of spot 1, <-shaped on its exterior margin, a large spot beyond the cell touching the inner edge of spot 2, the fourth spot angled with the third and receding inwards, the fifth spot again angled internally confluent with spot 4, the posterior row of four spots touches the exterior edge of the second large spot in the

previous row, and each spot is angled externally but is rounded internally, the upper three touch each other, the fourth being isolated on the inner margin, the subterminal row is obscure consisting of little more than an indefinite stripe.

♀. Both wings brightish-purple with a blackish spot at the end of the cell, that on the primaries being much larger than the one on the secondaries. Primaries with a broad brown costa and termen and a small (comparatively) lemon-coloured spot beyond the black spot terminating the cell; secondaries with a very broad brown costa and a broad brown somewhat irregular termen. Underside primaries as in the male, but the divisions between the cell spots are pale blue and the lemon spot shows through. Secondaries as in the male but greyer, the pattern therefore shows more distinctly and the spots in the median area are more confluent.

Expanse ♂ 53, ♀ 52-53 mm.

Hab. VICTORIA.

This species is distinct from *O. idmo*, Hew., to which it is very nearly allied, the shape of the wings in the ♂ is quite different, the costa of the primaries is more curved, and the termen is distinctly produced outwards between veins 2 and 5; in *idmo* the termen is nearly straight, receding from near the apex to the tornus, the shape and width of the brown costa and termen are very different, and below the posterior catenulated stripe is different in position and shape whilst the under-side of the secondaries differs considerably in pattern also.

OGYRIS IDMO, Hew.

O. idmo, Hew. Cat. Lyc. B. M., p. 2, pl. I, figs. 3, 4, 1862. Ill. Diurn. Lep. Lyc., p. 2, 1863; *id.* Kirby, Cat. D. L., p. 425, 1871; *id.* Semper, Journ. Mus. God., p. 55, Heft 14, 1878; *id.* Miskin. Proc. Lin. Soc. N.S.W., p. 24, 1890; *id. idem.* Ann. Queensl. Mus., p. 72, 1891; *id.* And. and Spry. Vict. Butt., p. 104, 1894; *id.* Waterhouse, P. L. S., N.S.W., p. 248, 1903; *id. idem.* Mem., N.S.W. Nat. Club, p. 29, 1903; *O. orontas*, Hew., Cat. Lyc., B. M., p. 2, pl. I, figs. 8 and 9, 1862.

♂. Both wings dull brownish-purple or purplish-brown, in certain lights the purple has an almost red lustre. Primaries with a very narrow almost linear-brown termen. Secondaries with costa brown to vein 7, termen very narrowly brown. Under-side, both wings brown finely irrorated with pale grey. Primaries with three

increasing cell spots, edged with pale blue or blue and white lines; beyond the third spot, which is very large, is a broad fascia of greyish-white scales, followed by the posterior catenulated stripe from the costa to vein 1, the spots on the costa being large and tapering rapidly to the third spot, the least trace of a subterminal line. Secondaries more thickly covered with pale grey irrorations, the basal spots are obscure and only indicated by the very fine darker encircling lines, the median row of three spots irregular that in the cell very obscure; the third series of spots is very confluent, the one on the costa being isolated and the rest all confluent; the posterior row of four or five spots is irregular and fractured, the first and second below vein 6 being confluent and touching the previous series, together they form a reniform spot, spots 3 and 4 are projected outwards, detached from 1 and 2, but touching each other, spot 5 shifted inwards and isolated.

♀. Both wings brown with a dull purplish lustre over a portion of the wings. Primaries with the purplish lustre over half the cell and extending broadly for two-thirds of the inner margin, a dark large spot at the end of the cell followed by a larger lemon cream-coloured spot. Secondaries with the purplish lustre over three-fourths of the wing leaving merely a very broad brown border to the costa and termen. Under-surface similar to the male but in the primaries the pale cream spot shows through, and in the secondaries the pattern is much more distinct.

Expanse ♂ 52-57, ♀ 57-60 mm.

The distribution of this species is somewhat uncertain, but I believe that it is confined to Western Australia, and that the species found in South Australia and Victoria will all prove to be *halmaturia* and *waterhouscri*, B. B. I have seen no true *idmo* from either of these localities. I have before me now Hewitson's type specimen of *orontas* and it is identical with *idmo*. I have pointed out the differences between these species, and I would further state that I regard Tepper's species as distinct from *otanes*, Feld., both of which types are now before me.

OGYRIS OTANES, Feld.

Ogyris otanes, Felder Reise. Nov. Lep. II, p. 217, taf. 28, fig. 1-3, 1865; *id.* Kirby, Cat. D. L., p. 425, 1871; *id.* Semper, Journ. Mus. God. p. 55, Heft 14. 1878; *id.* Miskin. P. L. S., N.S.W., Ser. 2, V, p. 23, 1890; *id. idem.* Ann. Queensl. Mus. No. 1, p. 71, 1891; *id.* Waterh. (in parte)

P. L. S., N. S. W., p. 249, 1903; *id. idem.* Mem. N. S. W. Nat. Club, No. 1, p. 29, 1903.

♂. Both wings dull reddish brown purple, primaries with the brown termen narrow straight and of uniform width. Secondaries with the costa and apical area very broadly brown, the latter tapering into the wide brown termen, the tail at the tornus is somewhat developed, but not sufficiently as to be called a tail. Under-side. Both wings pale brownish, primaries with two obscure spots in the cell, finely divided by bluish white lines, followed by a large blackish patch with an irregular pale bluish pupil. The posterior catenulated stripe is composed of five irregular dark spots palely edged, followed by an obscure trace of a sixth shifted inwards. There is no trace of any subterminal or terminal line. Secondaries with pattern very obscure, the basal series of spots is barely discernible, in the median series the costal spot is very large, that in the cell much smaller and irregular, that on the inner margin smaller still, the series at the end of the cell is confluent irregular extending from the costa to the inner margin, the second spot (from the costa) being very large and touching the posterior series which is composed of a pair of confluent spots followed by a second pair of confluent spots shifted outwards, beyond which is an isolated spot shifted well inwards.

♀. Both wings brighter purplish, primaries with the wing beyond the cell and above vein 3 brown. A darker patch at the end of the cell followed by a pale lemon-coloured smallish patch. Secondaries with the costa above vein 6 brown and a broad brown termen. Under-side like the male but irrorated with grey so that the pattern is more distinct and the pale spot shows through in the primaries.

Expanse ♂ 45, ♀ 48 mm.

Through the kindness of Mr. Rothschild I have Felder's types before me and am therefore enabled to compare them with specimens sent me from South Australia.

The shape of the insect is that obtaining in *idmo*, Hew., the apex of the primaries being somewhat acute and the termen straight; the colour also is nearest to that species, but is paler and somewhat brighter, it is however smaller and the under-side pattern is quite diverse. Mr. Waterhouse has kindly sent me for examination two specimens from Kangaroo Island with a query as to whether they are Felder's insect, but after a very careful comparison I believe them to be distinct, and they are the form named by Tepper *halmaturia*. I have now before me the type of this species as well as Felder's type (I must here express

my best thanks to Mr. Tepper for the loan of it), and I consider that they are distinct forms; more material may prove them to be sub-species, but they differ sufficiently to warrant them being named. The locality for *otanes* will therefore be South Australia only.

OGYRIS HALMATURIA, Tepper.

O. halmaturia, Tepper Com. Ins. S. Aust. II, p. 12, 1890. *O. otanes*, Feld., Waterh., P. L. S., N.S.W., p. 249, 1903 (part); *id. idem.* (part) Mem. N.S.W. Nat. Club, p. 29, No. 1.

♂. Both wings brighter purplish. Primaries with the termen broadly brown, broadest at the apex and tornus, the purplish area terminating in an even curve from the costa to the inner margin. Secondaries with the purple area almost confined to the cell and about two-thirds beyond it. Under-surface like *otanes*, Feld., but much greyer. In the primaries the catenulated posterior stripe is curved, not straight as in Felder's species. In the secondaries the pattern is more obscure and there is a broadish indefinite band of darker shading outside the posterior stripe which is more marked in the female than in the male.

♀. Like the male in all respects except that the colour is brighter and there is the pale spot on the primaries.

Expanse ♂ 46, ♀ 50 mm.

The types from Kangaroo Island are in the S. Australian Museum. Mr. Waterhouse also has specimens from the same locality.

This species may be distinguished from *otanes*, Feld., by the marked arched and broad termen to the primaries, by the broad brown termen in the secondaries, and by the shape of the wings, the termen being arched and the apex rounded.

It is very desirable that a trip should be made to Kangaroo Island and also to the localities in South Australia from Cape Willoughby to the south-west corner.

The species frequents broken country, thinly studded with *Melaleuca* shrubs, between which, Mr. Tepper tells me, they sailed in couples but were very wary and difficult to approach. It is however much to be wished that a good series of both these closely-allied species could be obtained, so that we could see whether the distinctions are constant.

OGYRIS MEEKI, Roths.

O. meeki, Roths. Nov. Zool. VII, p. 274, pl. V, fig. 1, 1900.

The female of this species is as yet unknown; we may expect it to have three tails and to have a pale spot on the primaries; the male is the largest of the genus and the only species that has fully developed tails; the outline of wings is different to all others inasmuch as the costa of the primaries is more strongly arched and the apex produced, with the termen slightly excavated below it, thus giving it a very distinctive appearance from the rest of its allies; it may also be recognized by the uniform deep purplish tone of its upper-side which is quite different from the colour of any other species of the genus.

OGYRIS ZOSINE, Hew.

O. zosine, Hew., Exot. Butt., I, pl. I, figs. 3, 4, ♂, 1853. *id.* Kirby, Cat. D. L., p. 423 (1871). *id.* Semper, Journ. Mus. Godef. Heft 14, p. 55, 1878. *id.* Hew., Cat. Lyc. B. M., pl. I, fig. 7, ♂ (nec ♀), 1862. *id. idem.* Ill. Diurn. Lep., p. 2, 1863. *id.* Miskin, Ann. Queensl. Mus., No. 1, p. 71, 1891. *O. genovera*, Hew., Exot. Butt. I, pl. I, figs. 5, 6, ♀, 1853. *id.* Semper, Journ. Mus. Godef. Heft 14, p. 55, 1878. *id.* Hew., Cat. Lyc., B. M., p. 3, 1862. *id.* Ill. Diurn. Lep., p. 2, 1863. *id.* Staud., Exot. Schmett. taf 96, 1888. *id.* Miskin, P. L. S., N. S. W., p. 23, 1890. *id.* Miskin, Ann. Queensl. Mus., No. 1, p. 71, 1891. *id.* Waterh., P. L. S., N. S. W., p. 245, 1903. *id. idem.* Mem. N. S. W. Nat. Club, p. 29, 1903.

This species is probably the best known of the genus, and is apparently becoming a dominant species; there are already three distinct local races in different parts of the country, that in the south being the brightest of all, whilst the type form obtaining in Townsville and its neighbourhood is the most sombre in colouring.

It has hitherto been known in all collections with which I am acquainted as *O. genovera*, Hew. It is difficult to discover how this has arisen, because Hewitson described *zosine* (l. c.) previously, and also figured it previously on the same plate. It is perhaps commoner in Queensland than elsewhere. The ♀ is dimorphic. I have therefore retained the name *genovera* for the pale blue ♀ as described

by Hewitson. There are however two other easily recognizable forms obtaining in other localities in Australia, the one from Coomooboolaroo, N. Queensland, and the other from Brisbane; these appear to be good constant local races, so I have no hesitation in naming them. Mr. Waterhouse tells me that he has taken this species feeding on *Loranthus linophyllus*, Feu., at the Richmond River, and on *L. celastroides*, Sieb., at Sydney. The egg is plain, spherical, flattened at the top, and is usually laid on the mistletoe stem near its origin with its host. The young larvæ are uniformly light brown (F. P. Dodd), and subonisciform; when full grown, however, they become less woodlouse-like, as they then measure from 25 to 32 mm., but when in motion they are considerably longer; in colour they are dirty cream colour to ochreous yellow above, and purplish below, with black spiracles, this being the form that is found in North Queensland; those found in the South however differ, and are, according to Waterhouse, brownish-red above and yellowish below. They hide in the cracks of the bark of the host tree or in holes in the mistletoe during the day, or beneath the surface of the earth, coming out at dusk and feeding at night, at which time I am informed the ants associated with them are likewise on the move; the species of ants that Dodd has found them with most commonly is *Ecophylla virescens*, but several other species also associate with them. They evidently protect the larvæ, and have been observed to milk them; in one instance an ant was observed to approach a larva and wave its antennæ over its terminal segments, and then to lightly touch it with its fore-leg, when a small globule of liquid was emitted from a small retractible nipple-like organ on the dorsum which was at once sucked up by the ant. The process was then repeated on the other side, there being two of these organs, one on each side of the dorsum; this happened two or three times, and the larva seemed quite composed and in no way incommoded by the incident. I possess larvæ in spirit both from Queensland and from Sydney, and the form from Sydney is darker and more highly coloured than that from the North. The pupa, some of which I have before me, is very dark brown, almost blackish, of the usual Lycænid form; it attaches itself by its terminal segments to the under-side of stones or loose bark and spins a girdle of silk across its back about the end of the wing cases and

so undergoes its transformation, and is quite undisturbed and unmolested by its ant hosts.

Mr. Waterhouse tells me that the form found at the Richmond River (N.S.W.) is distinctly smaller than that found both to the North and to the South of that locality, he says also that he never sees males on the wing until about 2 p.m. in the day, when they fly high (about thirty feet) around the *Eucalyptus* trees, and are very difficult to catch; the females are very rarely seen on the wing.

This year the species has been recorded from South Australia, Mr. Lyell having recorded it in the Victorian Naturalist, vol. xxi, p. 166 and 167; from Dimboola, larvæ and pupæ were taken in November and December last, the perfect insect emerging in the latter month. Mr. Lyell and his friend Mr. Fricot were hunting for the larvæ of *O. idmo*, but instead of finding it they discovered caterpillars of this species; they confirm the observation that it feeds by night, and they also state that it pupates at the foot of the tree below the surface of the ground. In order to test the action of the attendant ants one or two larvæ were placed a couple of feet or so away from the tree; they were however soon discovered and dragged carefully back to the tree by the ants at a pace much more rapid than their own rate; pupæ were likewise carried back to the tree.

OGYRIS ZOSINE-DUARINGA, sub spec. nov.

Ogyris genoveva, Miskin, Trans. Ent. Soc. Lond., p. 343, pl. xv.

♂. Both wings brightish purple. Primaries with a broad darker but equally bright suffusion across the median area of the wing, the brown termen is much narrower than in *zosine* and of equal width from the apex to the tornus. Secondaries with a very narrow brown termen, little more than linear. Under-side as in the type but with the spots more distinctly outlined and with a velvety clouding near the tail at vein 4.

♀. Similar to the female of the form *genoveva*, Hew., but the blue instead of cærulean is brilliant greenish-blue much more lustrous than in Hewitson's insect.

Expanse ♂ 54-58, ♀ 56-58 mm.

This subspecies was taken by Meek at Coomooboolaroo, where it appears to be a constant race; there is a long

series of it in the Tring Museum; it is also the form figured by Miskin (l. c.).

OGYRIS ZOSINE-MAGNA, sub spec. nov.

♂. Both wings rich purplish-blue. Primaries with the apical third of the costa and the apical half of the termen hoary. Secondaries dark brown to vein 6. Tail at vein 4 not developed, the scallop being but little longer than that at the end of veins 3 and 5.

Fringes white, interrupted at the veins, antennæ bright chestnut, very finely dark on the upper-side, the club being bright orange chestnut. Under-side as type species but darker grey.

♀. Both wings velvety black. Primaries with the basal area to about half the cell and half the inner margin brilliant silvery lustrous greenish-blue more greenish than in *duaringa*, and with the usual pale spot. Secondaries with the silvery lustrous greenish area more reduced extending only to just beyond the cell and tapering in an arc to three-fifths of vein 2. Veins 2 and 4 are developed into strong broad tails, and vein 3 into a prominent tooth, at each of the latter is a lustrous greenish blue spot. Under-side similar to the type species but more strongly marked.

Expanse ♂ 66, ♀ 70 mm.

The types are from Brisbane, and are in my collection. Mr. Waterhouse also has it from the same locality.

OGYRIS ABROTA, Doub. and Hew.

Ogyris abrota, Doubleday and Hew., Gen. Diurn. Lep., pl. 75, fig. 8 ♀, 1850; *id.* Hew. Exot. Butt. I, pl. I, figs. 1 and 2 ♂, 1853; *id. idem.* Cat. Lyc., B. M., p. 2, 1862; *id. idem.* Ill. Diurn. Lep. Lyc., p. 2, 1863; *id.* Kirby, Cat. D. L., p. 425, 1871; *id.* Semper, Journ. Mus. Godef., Heft 14, p. 55, 1878; *id.* Miskin, P. L. S., N.S.W., p. 25, 1890; *id. idem.* Ann. Queens. Mus., No. 1, p. 72, 1891; *id.* And. and Spry., Vict. Butt., p. 109, 1894; *id.* Waterh., P. L. S., N.S.W., p. 247, 1903; *id. idem.* Mem. N.S.W. Nat. Club, p. 28, 1903. *O. damo*, Doubl. List. Lep., B. M., pt. 2, p. 20.

This species is recorded from Victoria, New South Wales and South Queensland. Anderson and Spry have described its metamorphosis, they say that the ova are dull white and quite globular and are laid on the inside of loose bark by

the food plant or upon its stems. The larvæ feed chiefly upon *Loranthus pendulus*, and are onisciform, broadened and flattened at the anal segments and with a dorsal ridge; the general colour is dark fulvous paler along the ridge with a series of oblique (? lateral) stripes; on the tenth segment is a black irregular diamond-shaped patch pupilled with greyish-white, the last segment having a dark T-shaped mark, the spiracles are white encircled with black, the surface generally being rugose and punctated with minute bristles, with a subspiracular series of short bristles. The larval state is said to last for some months and to be delicate and difficult to rear; ants are always with them, and whilst they appear to be free from attacks of insect parasites, a fungoid disease at times kills large numbers of them. When full grown the larva measures from 20 to 25 mm.

OGYRIS IANTHIS, Waterhouse.

O. ianthis, Waterhouse, P. L. S., N.S.W., pp. 52-54, pl. I, figs. 1-4, 1900; *id. idem.* p. 341, 1902; *id.* p. 247, 1903; Mem. N.S.W. Nat. Club, No. 1, p. 29, 1903.

This species can readily be recognized from Waterhouse's description and from its rich orange-chrome-coloured female; it is apparently confined to the neighbourhood of Sydney. The ova are pale pinkish in colour, in shape they are flattened somewhat at the top, and reticulated all over. The larva, which hides at some depth in ants' nests during the day, does not move until night, and feeds on *Loranthus celastroides* in the dark, always making for a dark corner should a light be turned on it; it is pinkish-brown with a much darker dorsal line and paler lateral bands, one on each segment; the under-side is pale cream colour. The pupa is reddish-brown of the usual shape. I find that the organs on the last segment but one through which the fluid so greedily sucked by ants is passed are very marked in this species. I have a young larva in formalin now in front of me, and I notice that these organs (a pair) are situated on each side of the dorsum, and consist of a prominent tubercle shagreened all over, with a deep orifice in the centre from which the retractile tube is everted or withdrawn at will; when at rest the tube is contracted, and is apparently only emitted when the larva is induced to do so.

OGYRIS OLANE, Hew.

Ogyris olane, Hew., Cat. Lyc., B. M., p. 2, pl. I, figs. 10, 11, 1862; *id.* Ill. Diurn. Lep., p. 2, 1863; *id.* Miskin, P. L. S., N.S.W., p. 27, 1890; *id.* Kirby, Cat. D. L., p. 425, 1871; *id.* Semper, Journ. Mus. God., Heft 14, p. 55, 1878; *id.* Miskin, Ann. Queensl. Mus., No. 1, p. 72, 1891; *O. catharina*, Feld. Reise, Nov. Lep. II, p. 218, 1865.

♂. Both wings darkish-brown. Primaries with a patch of dull brownish-purple occupying the area between the median and submedian veins extending slightly into the cell and one-third the space beyond below vein 2. Apical area and half down the termen paler brown. Secondaries with the purple occupying the cell and one-third the space beyond, termen strongly crenulate.

Fringes white interrupted at the veins.

Under-side primaries dark brown with the cell spots defined by five pale metallic-blue lines, a dark irregular oblique line midway between the cell and the apex, beyond which the wing is suffused with whitish-grey scales, an obscure subterminal band tapering towards the apex extending into the grey area. Secondaries grey darker towards the inner marginal and tornal area, spots slightly darker defined by fine dark lines. Basal spots small, median series large, the first below the costa narrow touching the large spot across the cell which is confluent with the one below it, an isolated long oblique spot from the costa to the large cell spot just mentioned, third series, with the first and second spots confluent, the first strongly oblique, the second an inverted Λ -shape confluent with the two smaller spots below it, posterior series from vein 6, the second and third spots confluent shifted outwards, the fourth still outwards and slightly darker, fifth and sixth smaller and shifted inwards, a trace of a subterminal dark irregular line, lower terminal area darkly suffused.

♀. Like the male but with the purple area very slightly less in extent, whilst the secondaries on the under-side have the spots larger and darker thus forming a strong contrast with the grey ground-colour.

Expanse: ♂ 42-44, ♀ 44-49 mm.

Hab. S. AUSTRALIA, VICTORIA and N. S. WALES.

This description is of the form now found in Australia; it does not agree with the colour on the upper-side of Hewitson's type, which is paler and bright blue, the under-

side agrees, however, fairly closely. I have no doubt that the two insects are the same species, but that Hewitson's type may have undergone some change (possibly chemical) which has effected the difference in colour. In my study of the genus *Arhopala* I became convinced that the blues of that genus, hitherto considered so very constant and unchangeable in colour, are liable to alteration, this being especially so where the colours are apparently aniline, and further experience tends to confirm that opinion, though I am not prepared to say in what manner the change of tone is effected, but it apparently does not affect the scales themselves.

Anderson and Spry describe the ova as of a pearly lustre and flattened at the poles; they are laid on the edges of loose bark, or on the stems of *Loranthus pendulus* and sometimes on the galls which furnish hiding-places for the larvæ; these closely resemble the larvæ of *O. abrota*, Hew., but have a small black patch on the anal plate; they are at times great wanderers, and are strictly nocturnal feeders and have to travel long distances from their hiding-places to their food, which in the summer months is often scarce, as the *Loranthus* loses most of its leaves then; they appear to be able however to withstand prolonged abstinence and yet to undergo safely their metamorphoses, in these cases however the imagines are of course smaller than usual. The larvæ are also greatly subject to parasites, their worst enemies being two species of Diptera, one of which lays its eggs in its host, whilst in the case of the other fly, apparently the larvæ is not a parasite, but is furnished with pointed mandibles and is said to suck its victims dry. This dipterous caterpillar being very active and voracious works serious destruction amongst the larvæ of *olane*. The pupa is somewhat delicate and suffers from the rays of the sun if in too exposed a situation; it remains about a month in this state before emerging as the perfect insect.

Isolated specimens may be caught throughout the year, but October and November, and February and March are, according to Anderson and Spry, the months when they usually fly, though it is difficult to take, owing to its habit of flying around the topmost branches of the gum trees.

Mr. Spry informs me that he has never once seen this caterpillar attended by ants, though he has studied it and known it for years, the fact also that it is subject to the attacks of parasites no doubt corroborates his observations.

OGYRIS BARNARDI, Miskin.

Ogyris barnardi, Miskin, Proc. Linn. Soc. N.S.W., p. 27, 1890; *id. idem*. Ann. Queensl. Mus., No. 1, p. 72, 1891; *id.* Waterhouse, *idem*. p. 248, 1903; *id.* Waterhouse, Mem. N.S.W. Nat. Club, p. 28, 1903.

♂. Both wings dull purple. Primaries with termen narrowly brown, slightly broader at the apex. Secondaries with costa somewhat broadly brown and very narrow brown termen; termen very slightly crenulate. Under-side like *olane*, Hew., but the primaries are paler brown, and in the secondaries the spots are smaller and there is no dark suffusion.

Expanse ♂ 41-45.

Dawson River, Peak Downs (QUEENSLAND).

OGYRIS ORÆTES, Hew.

O. orætes, Hew., Cat. Lyc., B. M., p. 3, pl. I, figs. 12 and 13, ♀, 1862; *id. idem*. Ill. Diurn. Lep., p. 2, 1863; *id.* Kirby, Cat. D. L., p. 425, 1871; *id.* Miskin, P. L. S., N.S.W., p. 25, 1890; *id. idem*. Ann. Queensl. Mus., I, p. 71, 1891; *id.* Waterh. P. L. S., N.S.W., p. 335, pl. XIV, figs. 1 and 2, 1902; *id. idem*. p. 246, 1903; *id. idem*. Mem. N.S.W. Nat. Club, I, p. 29.

The only locality of which we are certain at the present time is Queensland. Mr. Waterhouse informs me that the specimens mentioned by Miskin (l. c.) from W. Australia and Victoria are *hewitsoni*, whilst the ♀ in the Australian Museum is a ♂ *amaryllis*. Dodd has bred the species plentifully, and he tells me that the full-grown larvæ are light yellowish-brown faintly tinged with green, and that he has always found them among or close to communities of ants. The pupæ are dark brown, and are of the usual shape; I have specimens now before me, but there is nothing worthy of note in them. Dodd says they "tick" in the same way as *genoveva*, only decidedly more slowly and not so loudly.

OGYRIS HEWITSONI, Waterh.

O. hewitsoni, Waterh., Proc. Linn. Soc. N.S.W., p. 338, pl. XIV, f. 5-8, 1902; *id. idem*. p. 246, 1903; *id. idem*. Mem. N.S.W. Nat. Club, p. 29, 1903; *O. amaryllis*, And. and Spry, p. 102, 1894.

The female of this insect is unrecognizable on the upper-side from the ♀ of the *orætes*, except that in the present species the brilliant blue extends over the upper margin of the cell, whilst in Hewitson's species it does not. Under-side, like the male, except that the pattern is generally more distinct and isolated. In the cell of the primaries are two large vermilion red spots edged on each side with pale metallic bluish, and with traces of red further along the cell.

This species seems to be the commonest of all the genus with the exception possibly of *genoveva*. It has been recorded from all the Australian States except Tasmania. I am again indebted to that careful observer, F. P. Dodd, for information as to the life history. He finds the larvæ in the same localities as *orætes* always among or near ants; when full fed they are grey or greyish-brown, and are duller in colour than the other species he has taken; the pupæ emit similar sounds, and like the preceding insect "tick" more slowly than *genoveva*. These sounds are not continued for any length of time, but a gentle touch or a shake will generally set them going again, and when one specimen begins others in the vicinity as a rule follow its example. Mr. Dodd tells me that each of the three caterpillars of this genus that he is acquainted with feed at night only.

OGYRIS HEWITSONI-MERIDIONALIS, sub spec. nov.

♂. Both wings with the blue decidedly deeper and less silvery in tone. Under-side altogether darker, the cell markings larger and the white edgings tinged with blue. Secondaries browner, with none of the strong contrasts that are so conspicuous in *hewitsoni*; the spots are browner and not so broken up as in Waterhouse's type race.

♀. Both wings with the blue of a lilac lustre, not silvery. Under-side similar to the type form.

Expanse ♂ 40-41, ♀ 42 mm.

The Southern form from Victoria is very decidedly less brilliant than Waterhouse's species, it is also much smaller. I have it from several localities, and as Mr. Waterhouse says that these differences are constant, it seems to be advisable to name the local race.

OGYRIS AMARYLLIS, Hew.

O. amaryllis Hew., Cat. Lyc., B. M., p. 3, pl. I, f. 5 and 6, ♀, 1862; *id. idem.* Ill. Diurn. Lep., p. 2, 1863; *id.* Kirby, Cat. D. L., p. 425, 1871; *id.* Miskin, P. L. S., N.S.W., p. 26, 1890; *id. idem.* Ann. Queensl. Mus., p. 72, 1891; *id.* Waterh., P. L. S., N.S.W., p. 336, pl. XIV, f. 3, 4, 1902; *id. idem.* Mem. N.S.W. Nat. Club, p. 29, 1903.

This species can easily be recognized from its predecessor by the very broad borders to the primaries and by the deeper tone of blue in both wings.

The range of the species appears to be restricted to the neighbourhood of Brisbane (S. Queensland) and the Richmond River in New South Wales, from which latter locality Waterhouse has bred it. The ova are pinkish grey, somewhat flattened with raised reticulations, and are laid on the mistletoe knobs. The larvæ feed on *Loranthus linophyllus*, and when young are greenish, but later they become dark grey assimilating very closely with the host-plant of the *Loranthus*.

OGYRIS ÆNONE, Waterhouse.

O. ænone, Waterh. P. L. S., N.S.W., p. 339, pl. XIV, fig. 9 ♂, 1902; *id. idem.* p. 246, 1903; *id. idem.* Mem. N.S.W. Nat. Club, p. 29, 1903.

♂. Both wings brilliant lustrous morpho-blue, more brilliant and lustrous than in any other of the genus, in certain side lights having a metallic mauve lustre. Primaries with the costa broadly blackish increasing at the apex, termen narrowly blackish increasing rapidly towards the apex, and decreasing slightly towards the tornus. Secondaries with the costa broadly dark greyish and termen very finely black. Under-side. Both wings pale whitish dove-grey. Primaries with three increasing cell spots palely edged, the basal spot pale brownish, the second and third deep black with bluish white margins; below each of these latter a black spot, catenulated stripe very irregular consisting of seven spots, the first two below the costa quite pale, the third blackish and small, fourth slightly larger shifted outwards, fifth shifted inwards, sixth very large and ovate inclined outwards, seventh oval rather smaller shifted and inclined inwards, a trace of a subterminal line. Secondaries rather darker than the primaries with three basal spots, the first and third very small median series widely isolated, a small darkish spot below the costal

vein, a larger pale grey spot on the inner margin of the cell with two small spots below it (one on each side) followed by another pale spot on the inner margin, third series very irregular, a longish narrow spot below the costal vein, a pale round one in the angle of vein 7, a large irregular one closing the cell below which is an indefinite trace of a fourth followed by a larger and more distinct spot on the inner margin, posterior catenulated series, irregular and somewhat indefinite on its inner margin, the first spot large below vein 7, second and third shifted right outwards, fourth and fifth well inwards, sixth spot obscure, shifted inwards, an indefinite subterminal slightly dentate stripe, a trace of a brownish spot on the slightly developed lobe at the tornus.

♀. Both wings less lustrous and not quite so pale a blue as the male with broader margins. Primaries with a black invading spot at the end of the cell and a creamy yellowish costal patch in front of the apex. Under-side. Primaries like the male but with all the spots larger and darker, and between the cell spots large patches of very pale (washed out) orange. Secondaries similar to the male but with the spots darker, and a white oblique broken stripe right across the wing across the middle of the cell edged by a broad indefinite suffusion of golden brownish, termen with a similar suffusion.

Expanse ♂ 52, ♀ 54 mm.

This species is only recorded from Cooktown; the brilliancy of its upper-side and the paleness of the under-side, together with the small and isolated arrangement of spots beneath, will enable it to be readily separated from any other of the group.

TABLE OF THE DISTRIBUTION OF THE SPECIES OF OGYRIS.

	Western Australia.	South Australia.	Victoria and Kangaroo Island.	N.S.W.	Queensland.	New Guinea.
<i>O. Waterhousei</i>	Bethune-Baker, ? And. and Spry. Lyell.	...	...	...
<i>O. idmo.</i>	Hew. and coll. J. J. Walker.	...	...	...	...	...
<i>O. otanes</i>	...	Felder.	Coll. Tepper.	...	...	...
<i>O. halmaturia</i>	Tepper.	...	...	...
<i>O. zosine</i>	Lyell.	Waterh.	Hew. and coll.	...
<i>O. zosine-duaranga.</i>	Dodd.	...
<i>O. zosine-magna</i>	Miskin and coll.	...
<i>O. meeki</i>	Meek (Tring Mus.)	...
<i>O. abrota</i>	And. and Spry.	Doubleday.	Coll. Waterh., coll. Bethune-Baker.	...
<i>O. icnthis</i>	Waterh.	Waterh.	Rothschild.
<i>O. olane.</i>	...	Waterh.	And. and Spry. Waterh.	Waterh.	Lower. ? Waterh. ?	...
<i>O. barnardi</i>	Miskin and Bethune-Baker.	...
<i>O. oretes</i>	Hew., Waterh. and coll. Dodd.	...
<i>O. hevitsoni</i>	And. and Spry.	...	Hew., Waterh. and coll. Dodd.	...
<i>O. hevitsoni-meridionalis</i>	Waterh. and Bethune-Baker.	...	...	...
<i>O. amaryllis</i>	Waterh.	Hew.	...
<i>O. anone</i>	Waterh. coll. Turner (Cooktown).	...

CHARACTERS OF THE GENITALIA OF THE SPECIES OF OGYRIS.

	Classis.	Girdle.	Tegumen.	Falces.	Penis-sheath.
<i>O. idmo</i> Plate xv, fig. 10 and 10a.	Broad, excavated for the lower half of apex, upper half nearly rectangular.	Strong, with the inner margin curved over so as to appear semi-tubular.	Very ample, outer outline nearly even.	Heavy and long, with a very broad upward curve, tapering very rapidly from the curve to the apex. Lighter with a sharp upward curve.	Rather long, orifice expanded, large and copious. Similar to <i>idmo</i> , but rather smaller.
<i>O. otanes</i> Plate xv, fig. 2 and 2a.	Elongated, lower part of apex suddenly excavated in a circular form, upper part produced and somewhat rounded.	Rather weak, and narrow.	Ample, with upper part slightly produced.		
<i>O. halmathuria</i> Plate xv, fig. 3 and 3a.	Broadish, subtriangular shortened as to its lower apex, slightly excavated in the centre, obtusely and slightly produced as to its upper half.	Strong, somewhat broad.	Very ample, produced backwards in a strong curve, outer margin even.	Strong long, similar to <i>idmo</i> , but rather smaller.	Shorter, more even in shape with orifice less expanded, less copious and smaller.
<i>O. cosine</i> Plate xv, fig. 5 and 5a.	Very broad with lower apex rounded, deeply excavated above, with upper portion and apex subrectangular.	Broad and shorter than usual.	Very ample, extending nearly half down the lateral supports with the outer margin even.	Strong and long with an acute curve (almost angled) above the centre, apex slightly curved also.	Short, very broad at the base, straight gradually tapering to the orifice, which is small and tubular.
<i>O. abrota</i> Plate xv, fig. 6 and 6a.	Very broad and short, with lower and upper apex strongly produced, the former rounded, the latter almost hooked.	Of medium width, tapering rapidly to the base.	Moderately ample, hollowed at the outer margin, slightly produced at the vertex, the lower extremities lobe-shaped.	Slender, slightly curved, with the elbow right at the base.	Stout, of nearly uniform width, slightly hollowed in the centre with the orifice somewhat funnel-shaped.
<i>O. iamthis</i> Plate xv, fig. 9 and 9a.	Sickle-shaped with very broad bases, with the outer extremity of the base produced outwards.	Slight, rather long, tapering very slightly towards the tegumen.	Ample, hind vertex produced upwards into a point with the girdle, front margin straight.	Rather slender, slightly curved, with the elbow right at the base.	Stout, of nearly uniform width, but slightly expanding towards the orifice, which is slightly funnel-shaped.

<p><i>O. olane</i> Plate xv, fig. 8 and 8a.</p>	<p>Long and narrow, curved, apical third narrower. A slight bulb at the extreme base of the clasp. Apex slightly curved and re-curved at the extremity.</p>	<p>Ample, tapering broadly to the tegumen.</p>	<p>Ample, hind vertex produced upwards similarly to <i>vanthia</i>, but projected backwards, also front margin slightly waved.</p>	<p>Rather slender, sharp, curved, with elbow right at the base.</p>	<p>Of moderate length, hollowed in the centre, with orifice trumpet-shaped.</p>
<p><i>O. barnardi</i> Plate xv, fig. 7 and 7a.</p>	<p>Longish, narrow, two-thirds from the base is a sudden excavation from whence to the apex it narrows, and terminates in a fine lip-like extremity.</p>	<p>Very ample, very broad, almost down to the base.</p>	<p>Narrower but large, hind vertex produced upwards, front margin waved.</p>	<p>Slender and straight, for the apical three-fifths where they are very acutely elbowed below which they are curved and broader.</p>	<p>Of moderate length and width, tapering suddenly at a fifth from the apex.</p>
<p><i>O. orates</i> Plate xv, fig. 4 and 4a.</p>	<p>Moderately narrow, curved, tapering to a point at the apex, slightly bulbous for the basal half.</p>	<p>Ample, and moderately broad to somewhat near the base.</p>	<p>Very ample, slightly produced forward, with front margin waved.</p>	<p>Rather slender, very broad, apex slightly hooked.</p>	<p>Moderately long, hollowed in the centre, rapidly expanding to a quarter from the apex, whence it decreases rapidly to the extremity.</p>
<p><i>O. heritsoni</i> * Plate xv, fig. 11 and 11a.</p>	<p>Moderately broad for the basal half when it suddenly narrows and terminates with a blunt rounded apex.</p>	<p>Narrow and long, strongly curved in the middle so as to form almost an angle.</p>	<p>Less ample than usual, somewhat produced at the top apex, and produced into lobes at the lower extremities.*</p>	<p>Slender, strongly elbowed near the base, with tip hooked.</p>	<p>Rather short and narrow, slightly expanding at the apex.</p>
<p><i>O. amaryllis</i> Plate xv, fig. 1 and 1a.</p>	<p>Unusually broad and large, excavated at the apex for its lower portion, above which it is strongly produced forward, with its extremity waved, and squarish in shape.</p>	<p>Of moderate width and fairly long.</p>	<p>Ample, apex slightly produced forwards, front margin slightly hollowed.</p>	<p>Slender, curved, with the elbow right at the base terminating in distinct hook.</p>	<p>Long, narrow, suddenly expanding into a wide orifice about a third from that extremity.</p>

* The shape and position of the genitalia of this species is so unusual that I believe death must have taken place almost during copulation.

EXPLANATION OF PLATE XV.

FIG. 1. *Ogyris amaryllis*, genitalia profile

- | | | | |
|------|---|---------------------|------------|
| 1a. | " | " | penis. |
| 2. | " | <i>otanes</i> , | genitalia. |
| 2a. | " | " | penis. |
| 3. | " | <i>halmaturia</i> , | genitalia. |
| 3a. | " | " | penis. |
| 4. | " | <i>orætes</i> , | genitalia. |
| 4a. | " | " | penis. |
| 5. | " | <i>zosine</i> , | genitalia. |
| 5a. | " | " | penis. |
| 6. | " | <i>abrota</i> , | genitalia. |
| 6a. | " | " | penis. |
| 7. | " | <i>bernardi</i> , | genitalia. |
| 7a. | " | " | penis. |
| 8. | " | <i>olane</i> , | genitalia. |
| 8a. | " | " | penis. |
| 9. | " | <i>ianthis</i> , | genitalia. |
| 9a. | " | " | penis. |
| 10. | " | <i>idmo</i> , | genitalia. |
| 10a. | " | " | penis. |
| 11. | " | <i>hewitsoni</i> , | genitalia |
| 11a. | " | " | penis. |